PARTLOW

Instruction Sheet

PISTON-PAK*

MERCURY BULB ELEMENTS

The Heart of all Partlow Instruments

*U.S. Patent No. 3,103,818

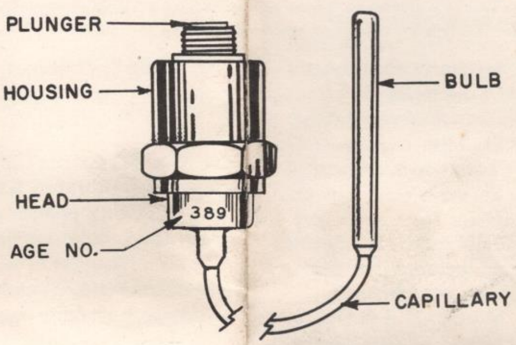

FIG. 1
Partlow Thermal Element

GENERAL

The Partlow thermal element is the temperature sensing portion of all Partlow temperature controls. It is a hermetically-sealed, mercury-filled assembly consisting of bulb (temperature sensing portion), capillary tube and head assembly. When assembled to the Partlow instrument, the element provides the mechanism actuation thru the expansion and contraction of mercury in the bulb due to temperature change.

SPECIAL NOTICE

The PISTON-PAK thermal sensing element is readily identified by its gold-anodized housing and is interchangeable with the former diaphragm-type element (silver housing), previously furnished as standard. Whenever a PISTON-PAK element is installed on a Partlow temperature instrument equipped with a temperature calibrated scale or chart, it is, however, necessary to replace the dial scale or chart with one especially calibrated for the new type element. If a new scale or chart was not furnishd with the new type element, inquire of your supplier; or The Partlow Corporation, and it will be furnished at no charge.

INSTALLATION

1. Remove and discard the red plastic protective cap from the top of head assembly.
2. Assemble element to instrument.

Electric and Pneumatic Instruments and Thermometers:

Disassemble old element and flange from instrument by removing two slotted hex head screws. The flange should then be unscrewed from old element and replaced on new one, making sure that it is as tight as possible. Raised portion of flange should be inserted in hole in instrument body, away from element. Assemble flange and element to instrument making sure the two slotted hex head screws are as tight as possible. Do not bend hex shaft projecting from instrument.

Thermally-actuated Gas Valves:

Elements for use on thermal valves incorporate a pin-type, spring-loaded plunger in the top of the head assembly which provides over-travel protection. Be sure your replacement element is so equipped. Until late 1968, the element assembly attached directly into the opening in the valve body in all series gas controls. At that time a gradual change-over to bodies incorporating element flanges was begun. With either style, carefully apply pipe dope (John Crane Plastic Lead Seal No. 2, or equivalent) to the threads of the element head, making sure none of the sealer gets into the head opening, before installing.

BULB LOCATION

1. Be sure that *entire* bulb is in area to be sensed or, if in liquid, that it is completely immersed.
2. Locate bulb where air or liquid is circulating as freely as possible.
3. Capillary may be bent to a radius of ½″ but not sharper as it might constrict the tubing. *Never bend pencil (or "P-type") bulb.*
4. Do not overheat the bulb beyond its range limits.

Bulletin No. 850-9 Piston-Pak Mercury Bulb Elements - Instruction Sheet

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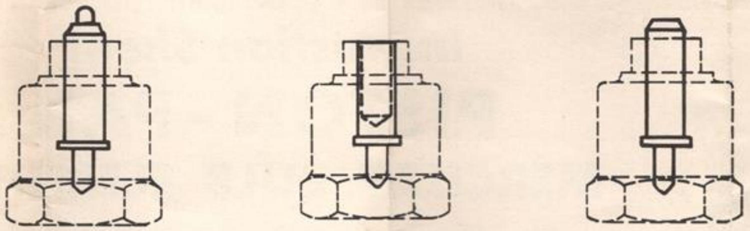

Type M Type L Type B

FIG. 2

Element plunger types. Type M is used on all thermal gas valves. Type B is used on non-indicating controls, series O, and N and Indicator 194. Type L is used on all other non-indicating controls, indicating and recording models.

5. The element head and instrument should never be mounted where temperature will exceed 150° F.

6. In mounting bulb, avoid the use of tape or other insulating materials on the bulb itself.

7. Bulbs may be elevated 25 feet above the control without affecting calibration. For bulb elevations exceeding 25 feet, consult factory for special accessory.

8. This assembly is hermetically sealed. If any part of the tubing or bulb is cut or ruptured, the seal is broken and the element will no longer function.

9. If you are installing a "Y" or "U" type bulb in its coiled form, the coil should be opened up to provide at least $\frac{1}{2}''$ between coils to permit circulation. If the "Y" or "U" type bulb is to be used in its elongated form thru the chamber being sensed, it may be bent to follow a prescribed path, but never sharper than a 2″ radius.

10. Steel bulbs should not be used where subjected to temperatures expected to continuously exceed 750°F.

11. Nickel bulbs should not be used in temperatures exceeding 665°.

STUFFING BOX INSTALLATION

Overtightening of 21-T-105 steel or stainless steel stuffing boxes can damage the thermal element by restricting the capillary bore. To prevent damage, the stuffing box gland nut should be turned $\frac{1}{2}$ to $\frac{3}{4}$ of a revolution from a finger-tight position. This is equivalent to a torque of 65 to 100 inch-pounds for steel and 130 to 180 inch-pounds for stainless steel.

RE-ZEROING PROCEDURE

At the time of installation, the instrument and replaced element should be checked for accuracy.

Use reliable check instrument you know is accurate.

Attach sensing bulb of check instrument directly to Partlow instrument bulb.

On All Indicating or Recording Instruments:

1. If Partlow indicating pointer or recording pen agree with checking instrument, no adjustment is necessary.

2. If the Partlow instrument does not agree with checking instrument, hex shaft extending into thermal element must be shortened or lengthened to accomplish the re-zeroing.

3. Loosen set screw at threaded end of hex shaft.

4. Using $\frac{3}{16}''$ wrench, turn shaft so that indicating pointer or pen agrees with check instrument.

5. Tighten set screw.

On Non-indicating Electrical Instruments With External Calibrated Dial: (Series ZC, G, GW):

1. If setting pointer agrees with checking instrument, no adjustment is necessary.

2. If adjustment is necessary, hex shaft extending into thermal element must be shortened or lengthened so that both readings agree.

3. Loosen set screw at threaded end of hex shaft.

4. Using $\frac{3}{16}''$ wrench, turn shaft so that the temperature being sensed settles out to agree with the setting of the control dial.

5. Retighten set screw.

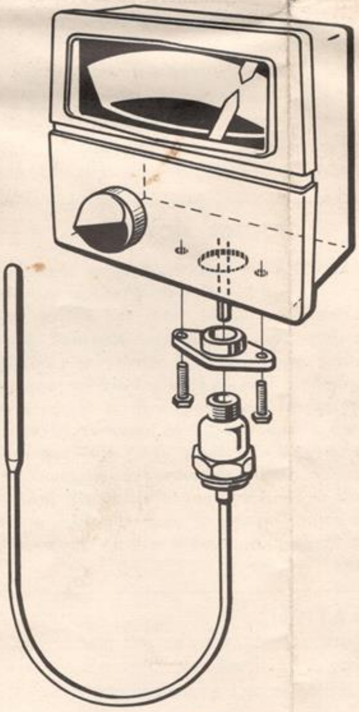

FIG. 3

Assembly of Element and Flange to Instrument
Be sure raised section of flange faces into instrument body.

On Non-indicating Electrical Instruments With External Calibrated Dial: (Series ZF):

1. If setting pointer agrees with checking instrument, no adjustment is necessary.
2. If adjustment is necessary, adjust dial setting to agree with temperature indicated by test instrument.
3. *Without disturbing dial setting,* remove dial knob.
4. Remove cover-dial assembly.
5. Loosen set screw and make adjustments by turning pinion gear with a screwdriver. Screw is shortened to raise temperature, lengthened to lower temperature. Turn pinion gear until switch actuates. Be certain check thermometer and control setting still agree. If they do not, make further adjustment.
6. Tighten set screw, replace cover and setting knob.

On Non-indicating Electrical Instruments (Without Setting Dial): (Series O, N, GB and GWB; and Electrical Non-indicating Instruments With Uncalibrated Dials (0-50):

Elements for the above instruments are not calibrated. Actuation point of control is adjusted by adjusting switch actuation screws using checking thermometer to indicate when the desired actuation point is reached.

On Mechanical Non-indicating Gas Controls (Series 10, 20, 28, 40, 48, 60, 68, 70, 713):

1. Set the control at the desired normal operating temperature.
2. Using a check thermometer as above, determine if the setting of the control agrees with the reading of the check thermometer.
3. If they disagree, loosen the set screw on the setting knob and reposition the knob and pointer to agree with the check instrument. Reset the control to the desired operating temperature and consult check instrument again. (Note: several rechecks and readjustments may be necessary since they are throttling type controls.)

ELEMENT MAINTENANCE

1. Do not lubricate thermal element or instrument.
2. Moisture or liquid should never be permitted to enter element.

ELEMENT INTERCHANGEABILITY

Elements of the same temperature range and the same plunger type are interchangeable.

ELEMENT IDENTIFICATION

The specification of the element is marked in coded symbols on the bottom of the element head. This should be used in ordering a replacement. The digit(s) shown following the designation number is the element length in feet. The number appearing on the side of the element head is a coded age number which may be required in establishing warranty.

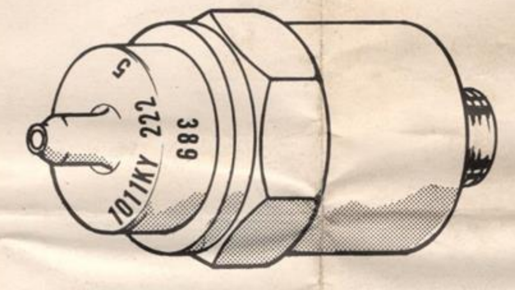

FIG. 4

Explanation of Marking Symbols

Number stamped on side of element head is the age number code. Code stamped on the bottom is the element description, with the element length following designation number.

We warrant our products to be free from defects in material and workmanship when leaving our Factory; provided, however, that our liability under this warranty is limited to repairing or replacing without charge F.O.B. our Factory, any defective product if returned to our Factory transportation prepaid within one year from date of shipment from our Factory; and provided further that in no event shall we be liable for consequential or other damages. No other representation or warranty, either expressed or implied, is made.

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